

FOR EXPLOSIVES, THINK BME

Introduction

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Disclaimer

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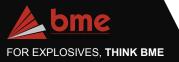




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- 3. Technical services
- 4. Product range
- 5. Innovation



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Safety

- BME overview
- Technical services
- Product range
- Innovation





OMNIA SAFETY, HEALTH, ENVIRONMENTAL AND QUALITY (SHEQ) POLICY



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Our goal

The achieve a sustainable leaderses that creates statisticate value through report this environmental monogeneent and poliation prevention; the highest level of employee leadth and writering prevention; of appeles and lineon; prevention; of appeles and lineon; prevention; a workplace that plates good value on the unitry and providing a workplace that plates good value on the unitry and providing of our propies.

Our commitment

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Safety for life launches





Our SHERQ commitment to our stakeholders



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Safety

for life

for



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Improve SHERQ knowledge and awareness

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Improve:

- Technologies
- Processes

Products •

Report openly

Listen to workforce

Safety plans н, Integrated Management Systems (IMS)

Environmental plan

Impact studies



Co-operate with all stakeholders

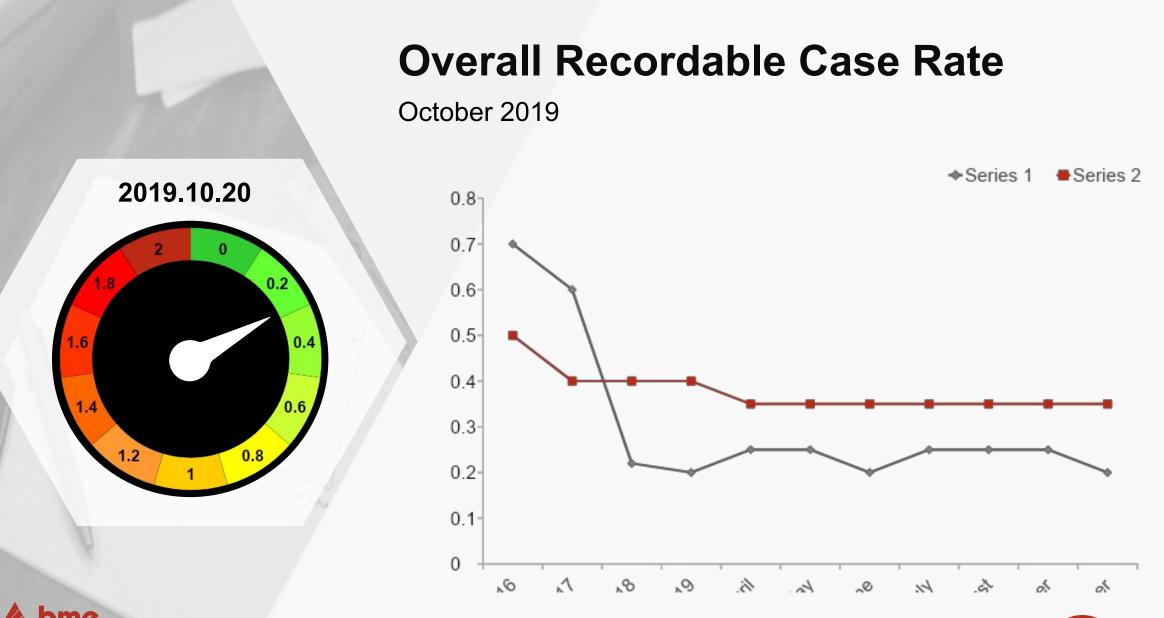
ISO:

- Implementation
- Integration

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Waste Management Plan

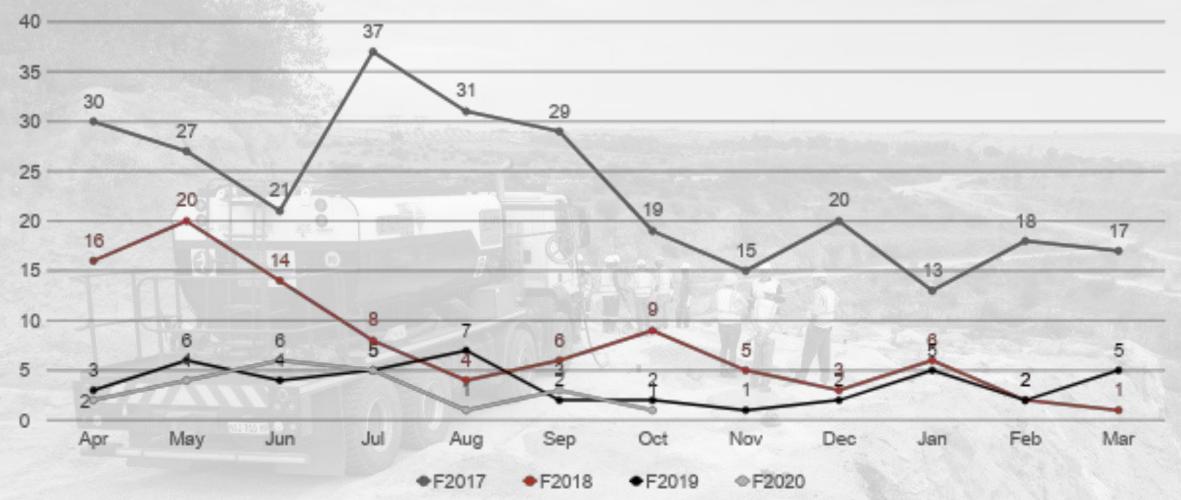








Vehicle Incident Tracking









Safety

- BME overview
- Technical services
- Product range
- Innovation





Safety

for life



Supply Capability – Overview

Omnia and BME have made significant investments into our manufacturing base:



Two Nitric Acid Plants Newest in Africa



Nitrophos Plant CN



Ammonium Nitrate Facility ANS + ANCN Solution



Two Central Emulsion Plants



Two Automated AXXIS[™] Electronic Detonator Plants



Cartridge Explosives Facility



Non-Electrics Assembly Plant

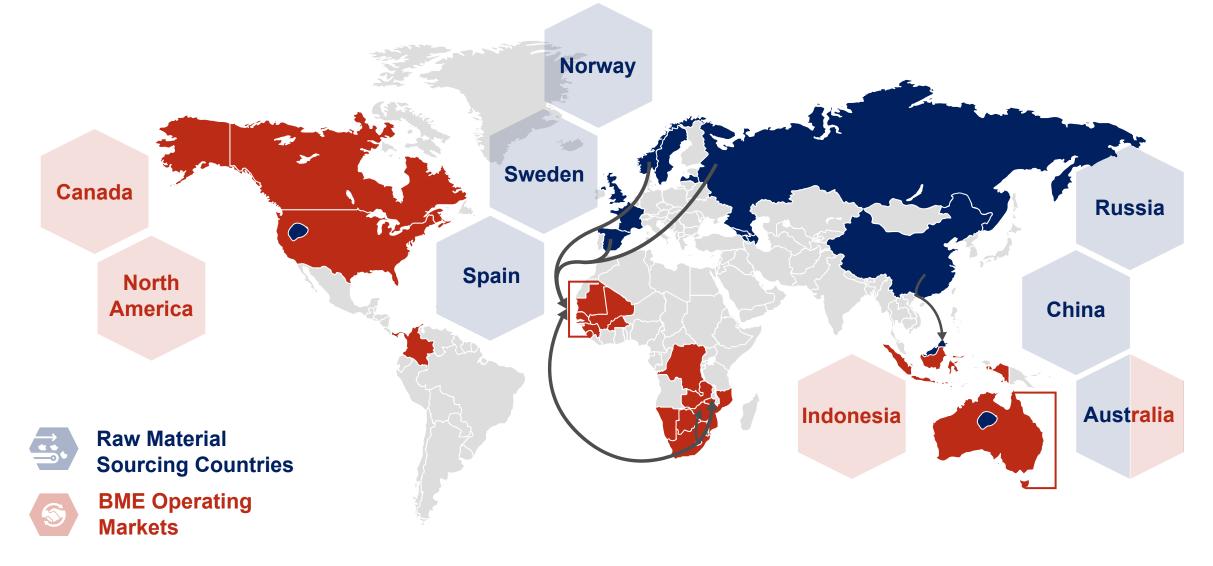


MMU Manufacturing and Assembly



Remote Emulsion Plants

Global Supply Snapshot



Dryden Production Facility





Safety for life



Losberg Plant





Production - Automation

Safety

- Remote handling of components
- History of actions/processes captured

Predictable Assembly

- Precision assembly
- Predictable assembly rate
- Reduced number off defects
- Controlled cost of assembly

Quality control

- In-line assembly verification (pull test and visual)
- Traceability of assemblies and assembly steps
- Accurate identification and removal of assembly defects

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Productivity

Increase in units produced per employee

Significant component of BME's quality drive

BME Vision

BME strives towards a customer focused, operationally excellent global explosives services company, that delivers real quantifiable value through the application of best in class technology, products and services, underpinned by a relentless drive for safety and engaged employees.

BME provides consistent, scalable and quality products and services, with focus on the user experience and value creation for both the customer and BME.







Governance Risk and Compliance



Establishment of Governance Committees

- Risk and Compliance Committee
- Capex Committee (Asset Management)
- Pricing Committee
- Investment Committee



Dedicated and Focused Functionalities

- Strategic Accounts Management
- Product Management
- Commercial Management
- Corporate Services
- Asset Managers
- Dedicated Project Managers
- Risk and Compliance Management



Establishment of Policies and Procedures

- Delegation of Authority (DOA)
- Policies and Procedures



Other Compliance Matters

- AFS and Tax Compliance
- Internal Audit Compliance
- External Audit



Matrix Reporting in Trans-National Strategy

- Enhanced functional support in all regions





BME Historic MILESTONES

1985

BME introduces used oil supplied by Sishen Iron Ore mine into manufacturing of HEF emulsions and continues to make use of used oil in emulsions.

This has a huge environmental benefit.

1988

BME builds its first bulk emulsion truck.





1984

MSI (Mining Services International, USA) starts business in SA, supplying bulk explosives to Sishen by establishing BME.

This business's basis was cold emulsion technology.

1987

BME builds its first heavy ANFO truck.

Dryden bulk emulsion plant is commissioned.

Omnia acquires BME from MSI to diversify into the mining explosive's market.

1991

Take over supply of bulk explosives to Optimum Colliery, making BME a major supplier of bulk explosives to S.A. surface mines.

Establishes ANFO manufacturing and bagging plant (Rustenburg) to expand product range.

Omnia establishes porous prill ammonium nitrate facility at Sasolburg.



BME diversifies into underground explosives and accessories.

1995

BME establishes a technical consulting division, Blastinfo, to provide advanced technical support to its clients.

2000

BME commissions:

First plant in West Africa in Mali. First international emulsion plant in East Africa, Tanzania.





1994

Builds and commissions the Megamite plant supplying cartridged explosive products to underground operations.

1998

Starts operating in Tanzania, the first BME client outside South Africa.

First working uphole emulsion project commissioned at PMC Phalaborwa.



BME commissions: Second major bulk emulsion facility at Losburg.

2006 New BME logo and branding launched.





2003

Purchases French electronic detonator company, to enter sophisticated electronic detonator market.

2005

BME commissions: Emulsion plant in Mauritania. Second emulsion plant in Mali.

2008

BME commissions: Third emulsion plant in Mali. Emulsion plant in Senegal.





BME commissions: Second emulsion plant in Mauritania. Emulsion plant in Zambia. Modern shock tube assembly plant and

testing facility.

Used oil collection division to compliment application of used oil in emulsions.

2012

Omnia's patented PGAN plant supplies S.A market using raw materials from Omnia's nitric acid and ammonium nitrate facilities.

Second nitric acid complex launched in Sasolburg - boosts S.A's nitric acid output by 330 000 tons p.a, ensuring supply security by bringing S.A's capacity to ±1,4m tons p.a.

BLASTMAP™III developed – an advanced blast and timing design software package.

2014

BME celebrates 30 years in business. Starts sales of AXXIS[™] electronic detonators in Australia.









30 YEARS in business



2010

Receives approval for accreditation as a training provider with the Mining Qualification Authority, leading to the offering of a Rock Breaking qualification.

First generation AXXIS[™] electronic detonator blast is successfully fired.

2013

BME commissions: Twelfth emulsion plant; Narrow reef emulsion system.



A world record blast of 5665 detonators is fired at an Australian coal mine.

2018

Expands into North and South America,

XPLOLOG[™] commissioned at a large opencast copper mine,

AXXIS[™] Underground Centralised Blasting System launched, allowing underground mining operations to initiate blasts from a safe place on surface.

> A world record blast of 7350 AXXIS™ electronic detonators is fired at an Australian coal mine.





5665

7350

2015

BME launches the first Portable Charging Unit (PCU) for use in the narrow reef environment at Platinum mine.

BME launches AXXIS[™] GII[™], second electronic generation detonator.

BME commissions a bulk emulsion vertical drop at 318m at a gold mine, a world first.

2017

Two automated lines are commissioned for AXXIS[™] detonators.

Another world record blast of 6690 AXXIS™ electronic detonators fired at a Zambian copper mine.

2019

BME finalises joint venture with Indonesian partner expanding our global footprint.





has a footprint in:





Outside Africa





Current Footprint in Africa





- Safety
- BME overview
- Technical services
- Product range
- Innovation



FOR EXPLOSIVES, THINK BME

Overview

Safety for life **★**★ Subject

matter experts



PRODUCTS	EQUIPMENT	PEOPLE	ADVANCED TECHNICAL SERVICES	TECHNOLOGY
 AXXIS[™] INNOVEX[™] INNOPAK[™] INNOFEX[™] Viperdet[™] Reactive ground capabilities (products + procedures) Plant automations Quality control and assurance 	<section-header><section-header><list-item><list-item><list-item><list-item><list-item><list-item></list-item></list-item></list-item></list-item></list-item></list-item></section-header></section-header>	 Highly trained management staff Technical staff (Blasting Engineers and Blasting Technicians) Operational staff 	 Distribution Down-the-hole Full blasting service Rock-on-ground Mine-to-mill (blast optimization) High-tech projects and audits 	 EQUIPMENT Drones BLASTGUIDE BLASTMAP™ XPLOLOG™ WALLPRO™ Double salt emulsions Used oil capability New generation AXXIS™ SYSTEMS CBS Vertical pipelines Pump control GPS functionality
	SUPPORTED BY WORLD CLASS TECHNICAL CAPABILITIES / PERSONNEL			

Principles of

six sigma applied

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Passionate, engaged and polite service

Supply security

SERVICES

bme

Down the hole [DTH]

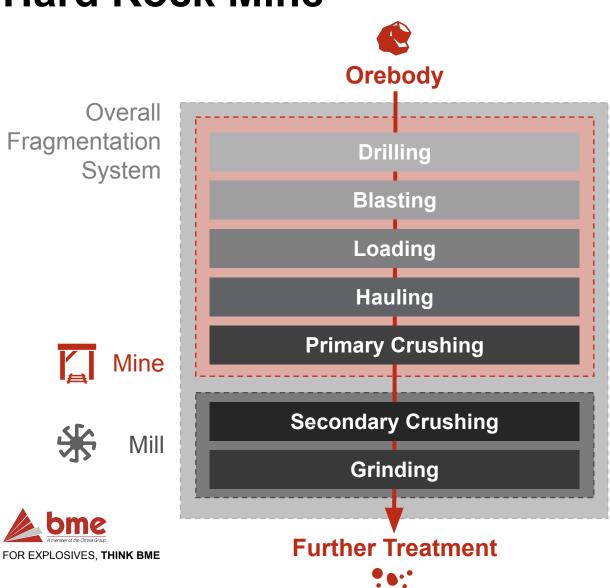
Product Delivery Prime, load, tie and shoot [P,L,T,S] Rock on ground [ROG]

> Mine to Mill [M2M]





Brief Description of the Processes: Hard Rock Mine





- Reduce diesel (with waste oil) 44 80%
- Drilling efficiencies (m3/m) 2.8% improvement
- Explosives (kg/m3) 3% decrease (Tantalite)
- Power **1.5%** reduction
- Secondary crushing 7% reduction
- Mill throughput 1.8% increase overall 186 t/hr. to 219 t/hr
- Milling count of 550 t/hr.
 No. of days/month exceeded 14 (from 6)
- Excluding capital savings: Shovels and crusher steel ball consumption





TECHNICAL SERVICES

OBJECTIVE Optimise Mine Productivity

> Blast Designs

BlastMapIII WallPro DensDepth

Blast

Timing Ore dilution control Back damage AXXIS™ Electronic

Delay Detonators

Quality

Control

VOD Instrumentation

Viscometers

Managing Charging Operation

XPLOPLUS logging Electronic blast reports

Blast Monitoring

Fragmentation analysis High speed videography Face profiling GPS Surveying Auditing and electronic delay detonators Vibration monitoring

Wall Control

Pre-split design Trim blast design

R&D for improved mine profitability

Energy codes Electronic detonators Blasting database development Aerial measurement techniques Heave and dilution modelling Fragmentation modelling

MMU (MPU)

Mobile Manufacturing/Pumping Units

FLOW RATES AND CAPACITIES

E-Series

Emulsion trucks

- 10, 15 or 20 ton units
- 120 kg/min up to 450kg/min

HA Series

Blend trucks

- 12 ton, 15 ton and 20 ton units
- 300 kg/min up to 750kg/min

In-house and tailor-made

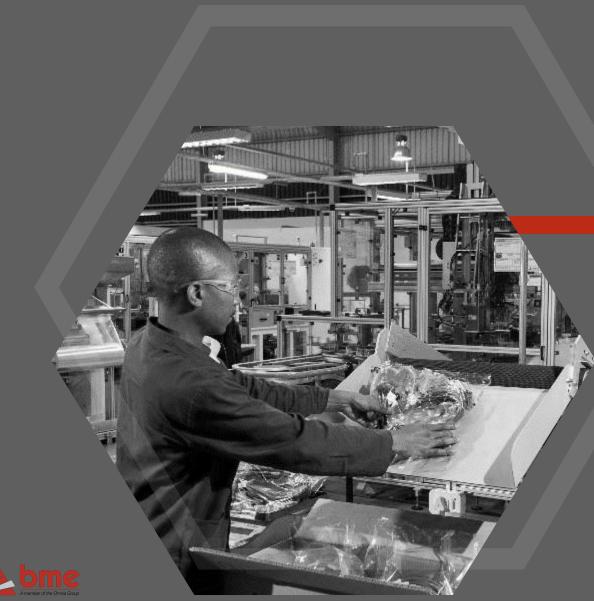












Safety

- BME overview
- Technical services
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Product Quality and Controls

Quality Assurance [ISO Accredited]

Focus

- Product descriptions
- MSDS or TDS
- Quality control measures Test type/frequency
- Quality plan per product
- Raw material COC's and optimization

Operating procedures:

- Divisional standards
- Company standards
- Work instructions

Key elements: Identification/ traceability

Raw materials
 Specifications/COC's

 Identification of product throughout lifecycle Product grade

- Operator competency
- Equipment reliability and accuracy

Emulsion Technology



DUAL SALT SYSTEM

Dual-salt formulation allows us to successfully re-pump our emulsions multiple times.

Customize emulsion systems to meet different customer requirements.

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EMULSIFIER

BME owns key emulsifier technology and knowledge.

Customised advance emulsifier to meet various applications requirements.



Bulk emulsion (surface application) contains high levels of recycled oil, reducing environmental impact without any detrimental effect on emulsion quality and performance.

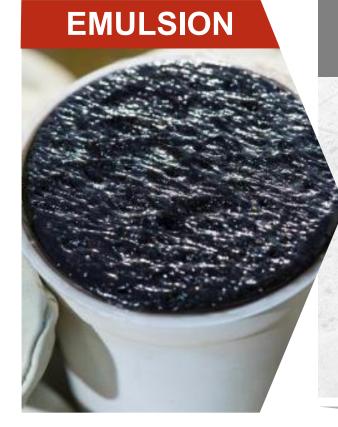


REACTIVE GROUND TECHNOLOGY

Specialised emulsion systems with inhibitors for use in highly reactive ground (Pyritic) rock conditions.



Product Overview



INNOVEX[™] 100 INNOVEX[™] 207

Features

Nominal bulk density: 1.46 - 1.50

- Relative weight strength: 84
- Relative bulk strength: 126

Features

- Relative weight strength: 90
- Relative bulk strength: 134

INNOVEX TM Lateral / Uphole

Features

- Nominal bulk density: 1.47 - 1.51
- Relative weight strength: 81
- Relative bulk strength: 121

COMPOSITION

- Ammonium Nitrate
- Calcium Nitrate
 - Fuel Oil Composition





Optimise Waste Oil Technology

Mineral Engine Oils



03

01

No synthetic oils Detergents Hydraulic – brake fluids

Benefits:

- Low cost replacement for FO – up to 80%
- High viscosity
 - gives thicker emulsion
- Produces more stability in CN-based emulsion

ENVIRONMENT:

- EASY
- COST-EFFECTIVE disposal





BME is committed to technologies that are cost-effective and reduce environmental impact





Pumpability Example

St. Helena Island

BME emulsion matrix can handle:

- Multiple pumping cycles *Re-pumpability*
- Extreme temperature, pressure and transportation conditions
- Highly robust system

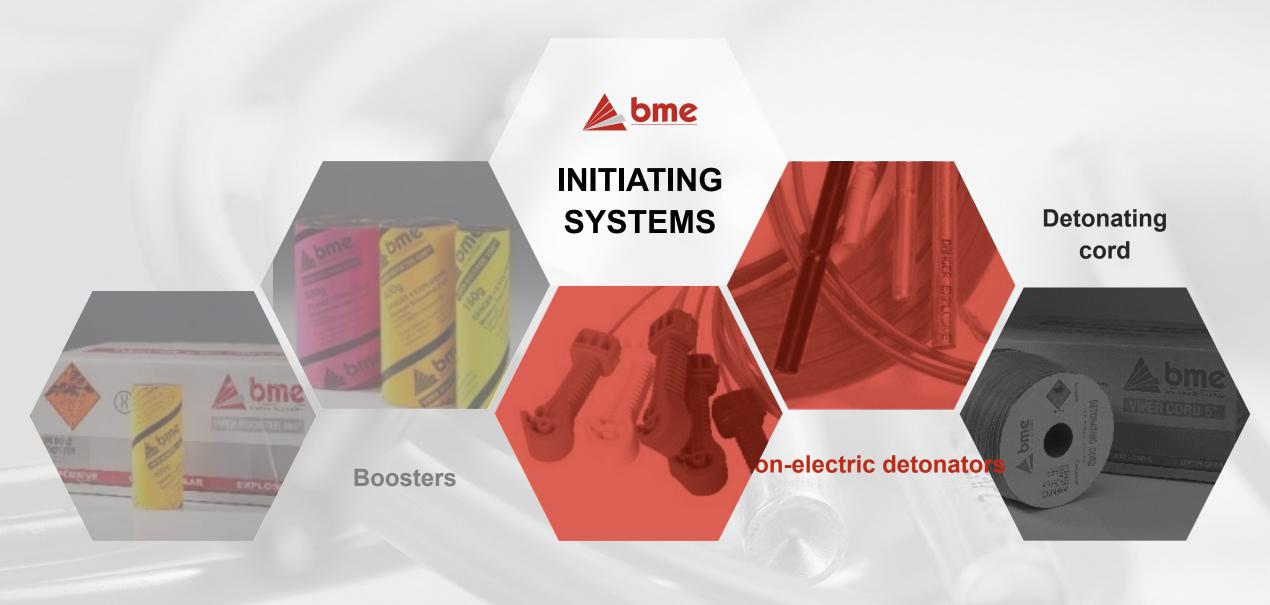


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Explosives Products







AXXIS™ [GII] System – Electronic Detonators



AXXIS[™] GIII Titanium

New Generation

Third generation of the AXXIS[™] System

- To support global growth
- Completely new

<-E-

4F

- Commercialised by end 2019
- Will be the best EDD system available...by far

Cstorage

NX >

AXXIS

-G-



AXXIS™ Field Quality Trend









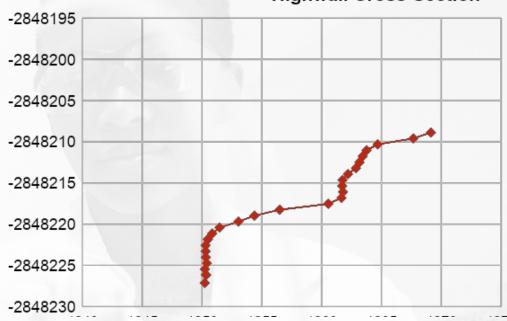
- Safety
- BME overview
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Innovation - General

- Plant automations
- Waste oil input increasing
- Underground emulsions and technologies
- Constant upgrade of software
- Drone innovation
- AXXIS[™] electronic development
 - Overall service packages (mine-to-mill / rock-on-ground)

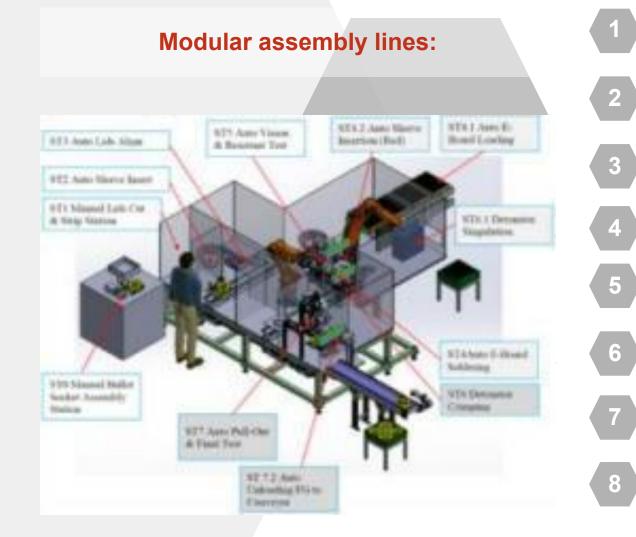




Highwall Cross-Section

Regional Automation

Omnia and BME have made significant investments into our manufacturing base:



Small footprint per assembly line

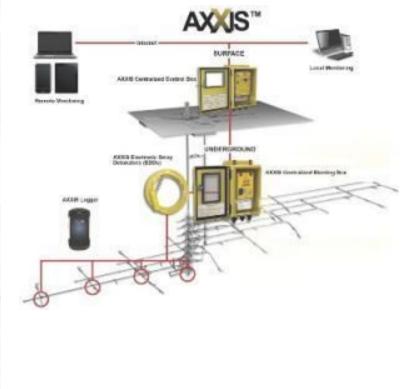
Minimised labour requirement in high cost Australian labour market

- Flexibility to accommodate product upgrades
- Option to decide on level of automation
- Scalability at manageable costs
- In-line quality control processes
- Fully integrated tracking and traceability
- Real time reporting and diagnostic data

Underground Technology



Centralized Blasting System - CBS





Software

BLASTMAP™

 Complete surface blast planning, design and analysis software. This powerful tool allows the design of the blasts from hole layouts to charge quantities, deck charging and blast timing.
 BLASTMAP™ integrates seamlessly with XPLOLOG™ and AXXIS™ to improve efficiencies and turnaround time for blasts.



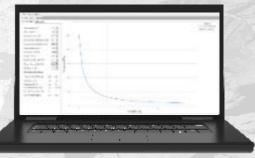
XPLOLOG[™]

- Capturing Surface pre-blast block data with the XPLOLOG[™] Logger which submits data to a cloud-based database for real-time reporting and decision-making by mine management.
- The XPLOLOG[™] platform also offers a comprehensive summary of the block progress via the Reporter website, including progress on dipping, priming, charging, top up and stemming.

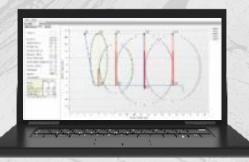


OTHER SOFTWARE

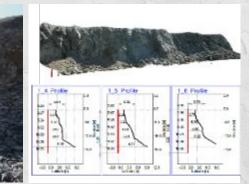
- GPS Functionality
- WALLPRO™
 3-D face profiling



WALLPRO[™] Pre-Split Designs

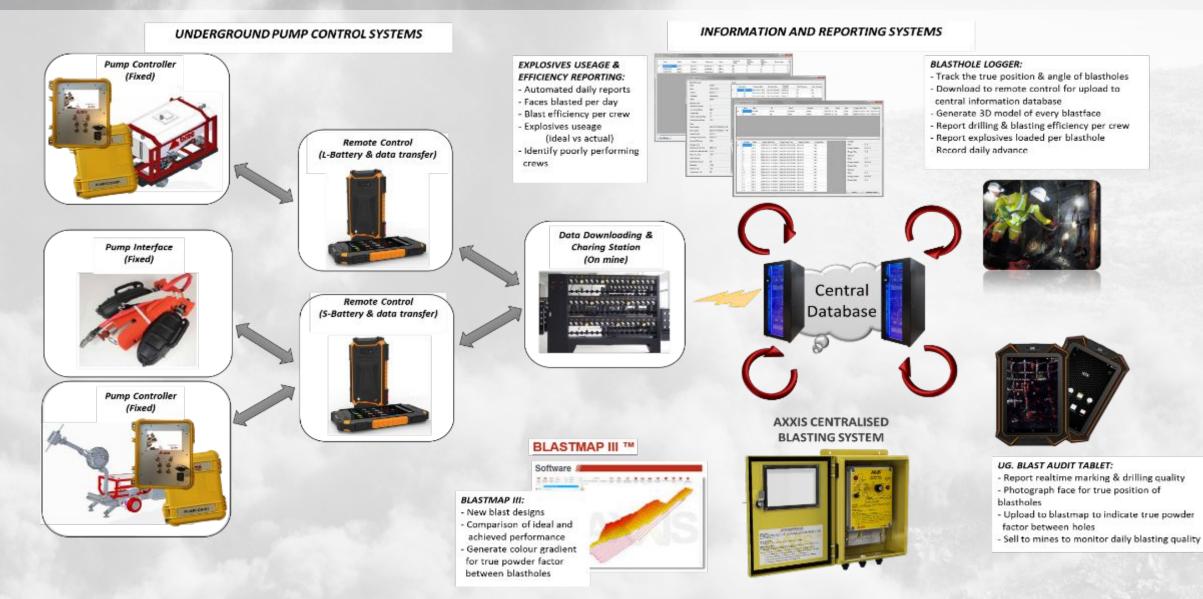


WALLPRO™ Trim / Buffer Designs

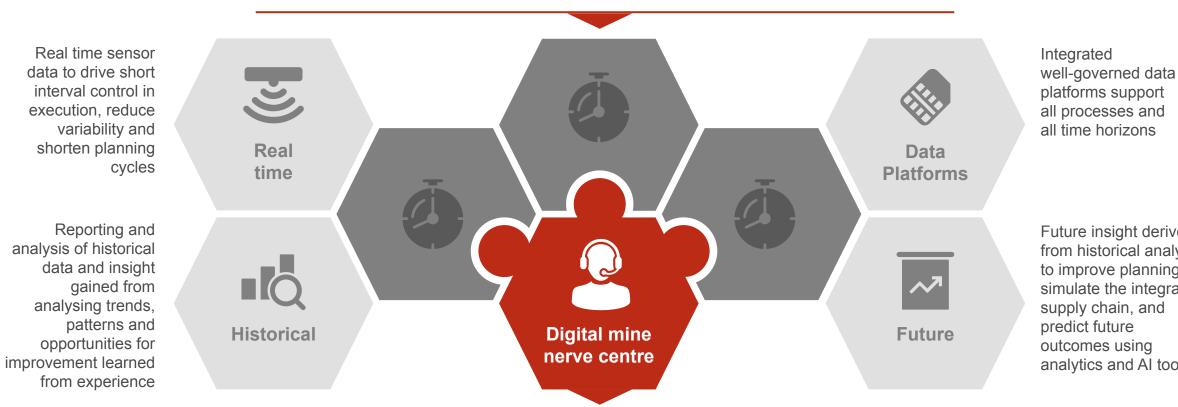


3-D face profiling

Reporting Systems / Software



Technology – **Future**



Integrated operational planning, control and decision support

Data driven insights drive improved planning control and decision support across the mining value chain





Future insight derived from historical analysis to improve planning, simulate the integrated supply chain, and predict future outcomes using analytics and AI tools

Summary



Strong presence and history in Africa and global expansion



Supply security

3

Flexible pricing structures





Commercial KPI's



Focused technology and technical services



Fit for purpose and quality-controlled material

- Extensive product range
- Double salt
- Waste oil
- World-class electronic detonators

Continuous improvement drive / innovation

Committed to skills transfer and training

Excellent safety record

8

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Training

- Processes and procedures (ISO)
- Responsible care



THANK YOU